

# ATTACHMENT 8: 2017 Study

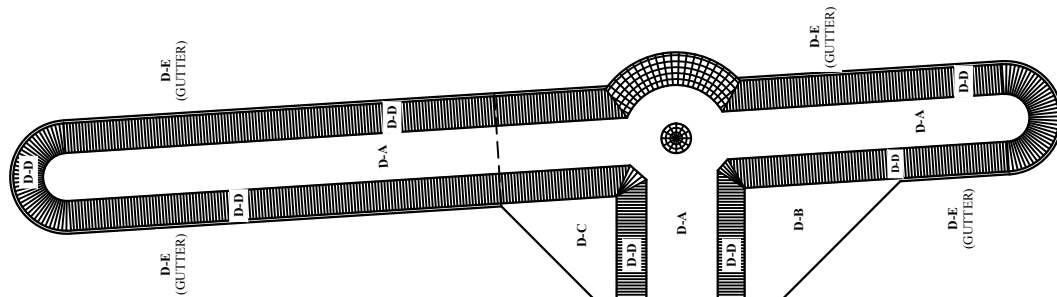
*Note to consultant: Only pages referencing the overall study and/or concourse D roofs are included. Contact MKE Engineering for the missing pages, if needed.*



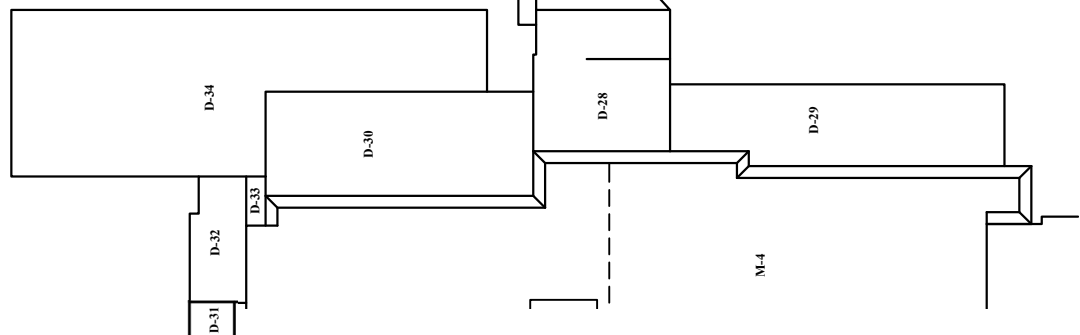
## General Mitchell International Airport 2017 Roof Survey & Budget Projections



December 2017



AREA	1 <sup>st</sup> Replacement Year	Cost Estimate (\$)
D-A	2026	382,937.50
D-B	2026	72,050.00
D-C	2026	46,062.50
D-D	2053	448,500.00
D-E	2026	75,000.00
D-0	2026	10,000.00
D-1	2022	57,062.50
D-2	2028	6,600.00
D-3	2022	21,875.00
D-4	2028	4,000.00
D-5	2028	20,937.50
D-6	2025	4,375.00
D-7	2025	9,687.50
D-8	2028	3,850.00
D-9	2022	12,250.00
D-10	2025	7,500.00
D-11	2026	28,437.50
D-12	2022	43,750.00
D-13	2026	4,687.50
D-14	2026	7,187.50
D-15	2026	7,187.50
D-16	2028	7,187.50
D-17	2022	35,000.00
D-18	2028	5,937.50
D-19	2028	19,687.50
D-20	2026	10,312.50
D-21	2024	9,000.00
D-22	2026	37,187.50
D-23	2022	50,331.25
D-24	2026	20,625.00
D-25	2022	40,937.50
D-26	2026	44,687.50
D-27	2026	10,625.00
D-28	2026	119,687.50
D-29	2026	162,812.50
D-30	2026	221,562.50
D-31	2022	10,312.50
D-32	TBD	24,780.00
D-33	TBD	3,459.00
D-34	TBD	220,057.00





December 26, 2017

Mr. Keith Kent  
General Mitchell International Airport  
5300 S. Howell Avenue  
Milwaukee, WI 53207-6156

RE: Facility Inspection

Dear Keith,

Per your request, a facility survey and evaluation was conducted by V & F Roof Consulting & Service from August 2017 through December 2017. The purpose of this survey and evaluation was to provide an accurate description of each roof section including roof make-up, estimated age, estimated remaining service life, maintenance issues, and replacement budgets.

#### ROOF NAMING LEGEND

<b>Roof Notation</b>	<b>Associated Roof Area</b>
A	Administration Building
B	Baggage
C	C-Concourse
D	D-Concourse
E	E-Concourse
M	Main Terminal
Salt Shed	Salt Shed
I	International Terminal
Power	Power House
Maint	Maintenance Buildings
Fire	Fire House
R	Regulator Building
P	Parking Structure
DO	Drop Off Area



The following pie chart visually describes the condition of the roofs over the entire facility. About 14% of the facility roof area is categorized as a Condition 1 meaning that replacement should be scheduled within the next 1-2 years. 30% of the facility roof area is categorized at a Condition 2 meaning that replacement should be scheduled within the next 3-5 years. The remaining 56% of the roofs are categorized at Condition 3, 4, or 5 meaning that they can be expected to last another 6-9 years, 10-14 years, or 15+ years respectively. The roofs that are categorized as either Condition 3, 4, or 5 should be inspected annually and preventative maintenance should be performed in order to maintain and extend the life of the roof.

The pages following the pie chart list all roof areas with an approximate area, condition, minor maintenance and leak repair budget, and replacement budget.

#### **FIVE YEAR BUDGET SUMMARY**

The following table details the five year re-roof and maintenance budget estimates.

	<b>2018</b>	<b>2019</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
<b>Roof Replacements</b>	\$355,000	\$355,000	\$175,000	\$175,000	\$175,000
<b>Maintenance Repairs</b>	\$45,000	\$45,000	\$45,000	\$45,000	\$45,000
<b>Total</b>	<b>\$400,000</b>	<b>\$400,000</b>	<b>\$220,000</b>	<b>\$220,000</b>	<b>\$220,000</b>

*Disclaimer: All dollar amounts are budget numbers only. To obtain exact dollar amounts, quotes will have to be obtained from V & F Roof Consulting & Service (or other roofing contractor) per each specific project.*





## ROOF REPLACEMENTS

The following roofs are in very poor condition and should be replaced within the next 1-5 years. The roof sections below are listed from the highest priority to the lowest priority.

	Roof Section	Area	Condition	Estimated Replacement Budget
1	D-A	27,850	1	\$306,350
2	D-B	5,244	1	\$57,640
3	D-C	3,350	1	\$36,850
4	D-E	2,280	1	\$60,000
5	D-0	700	1	\$8,000
6	D-1	4,150	1	\$45,650
7	D-3	1,535	1	\$17,500
8	D-6	265	1	\$3,500
9	D-7	606	1	\$7,750
10	D-9	780	1	\$9,800
11	D-10	600	1	\$6,000
12	D-11	2,054	1	\$22,750
13	D-12	3,200	1	\$35,000
14	D-13	286	1	\$3,750
15	D-14	546	1	\$5,750
16	D-15	520	1	\$5,750
17	D-17	2,600	1	\$28,000
18	D-20	780	1	\$8,250
19	D-21	630	1	\$7,200
20	D-22	2,775	1	\$29,750
21	D-23	3,726	1	\$40,265
22	D-24	1,550	1	\$16,500
23	D-25	3,072	1	\$32,750
24	Maint-3	26,600	1	\$585,000
25	C-1	6,060	2	\$66,750
26	D-26	3,370	2	\$35,750
27	D-27	792	2	\$8,500
28	D-28	8,710	2	\$95,750
29	D-29	11,845	2	\$130,250
30	D-30	16,110	2	\$177,250



31	E-15	6,290	2	\$67,250
32	I-1	19,360	2	\$212,960
33	M-4	77,080	2	\$847,880
34	Maint-1	10,900	2	\$239,800
35	Maint-4	8,200	2	\$164,000
36	Maint-5	26,100	2	\$26,750
37	Maint-6	1,215	2	\$24,300
38	Maint-7	16,540	2	\$330,800
<b>Total</b>				<b>\$3,346,905</b>

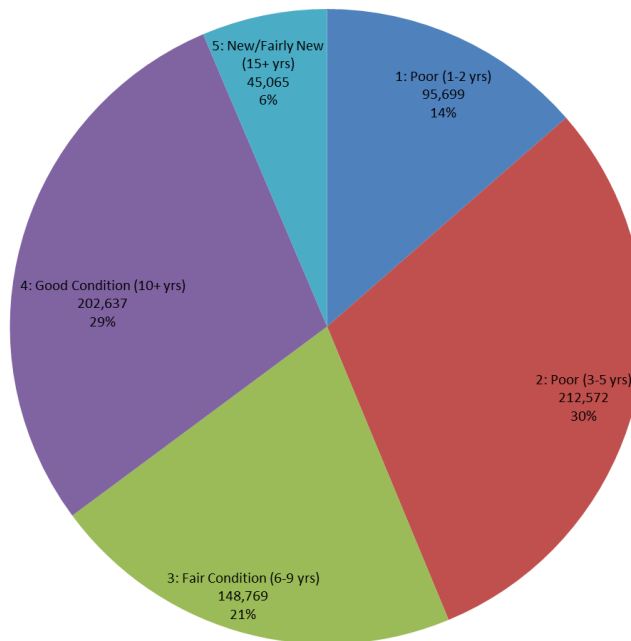


Condition	Area (SF)
1	95,699
2	212,572
3	148,769
4	202,637
5	45,065

Legend
1: Poor (1-2 yrs)
2: Poor (3-5 yrs)
3: Fair Condition (6-9 yrs)
4: Good Condition (10+ yrs)
5: New/Fairly New (15+ yrs)

### MITCHELL INTERNATIONAL AIRPORT BUDGETS

**Roof Condition Summary**



### MITCHELL INTERNATIONAL AIRPORT BUDGETS



Roof Section	Area	Condition	Maintenance Repairs	Annual Maintenance Budget	Replacement Budget
A-1	9,810	4	\$0	\$250	\$196,200
A-2	4,440	4	\$0	\$250	\$98,800
A-3	2,570	4	\$0	\$250	\$30,700
A-4	322	4	\$0	\$250	\$7,500
B-1	9,200	5	\$0	\$300	\$92,000
B-2	15,500	5	\$0	\$300	\$308,000
B-3	9,200	5	\$0	\$300	\$92,000
C-1	6,060	2	\$3,200	\$1,000	\$66,750
C-2	2,004	3	\$0	\$750	\$25,750
C-3	4,090	3	\$1,200	\$750	\$47,000
C-4	2,700	3	\$0	\$750	\$35,000
C-5	1,050	3	\$0	\$500	\$12,500
C-6	1,785	4	\$0	\$500	\$21,000
C-7	8,030	3	\$0	\$750	\$90,000
C-8	3,225	3	\$0	\$750	\$35,750
C-9	1,665	4	\$0	\$500	\$18,750
C-10	3,225	3	\$1,200	\$750	\$35,750
C-11	2,320	4	\$0	\$500	\$25,000
C-12	1,305	3	\$0	\$500	\$15,250
C-13	4,060	3	\$0	\$750	\$44,750
C-14	1,305	3	\$0	\$500	\$15,050
C-15	2,320	3	\$0	\$500	\$25,750
C-16	3,000	3	\$0	\$750	\$33,750
C-17	1,800	4	\$0	\$500	\$20,000
C-18	3,000	3	\$1,200	\$750	\$33,750
C-19	1,320	3	\$1,200	\$750	\$14,750
C-20	2,515	3	\$0	\$750	\$27,750
C-21	1,610	3	\$0	\$500	\$19,100
C-22	2,345	3	\$0	\$750	\$25,450
C-23	28,000	4	\$0	\$750	\$308,000
D-A	27,850	1	\$7,750	\$1,500	\$306,350
D-B	5,244	1	\$0	\$750	\$57,640
D-C	3,350	1	\$0	\$750	\$36,850
D-D	31,200	4	\$0	\$750	\$358,800



Roof Section	Area	Condition	Maintenance Repairs	Annual Maintenance Budget	Replacement Budget
D-E	2,280	1	\$0	\$1,000	\$60,000
D-0	700	1	\$0	\$500	\$8,000
D-1	4,150	1	\$0	\$1,000	\$45,650
D-2	480	4	\$0	\$200	\$5,280
D-3	1,535	1	\$0	\$1,000	\$17,500
D-4	280	4	\$0	\$250	\$3,200
D-5	1,470	4	\$0	\$300	\$16,750
D-6	265	1	\$0	\$400	\$3,500
D-7	606	1	\$0	\$400	\$7,750
D-8	308	4	\$0	\$200	\$3,080
D-9	780	1	\$1,750	\$750	\$9,800
D-10	600	1	\$0	\$450	\$6,000
D-11	2,054	1	\$3,200	\$800	\$22,750
D-12	3,200	1	\$1,200	\$750	\$35,000
D-13	286	1	\$0	\$400	\$3,750
D-14	546	1	\$0	\$400	\$5,750
D-15	520	1	\$0	\$400	\$5,750
D-16	545	4	\$0	\$200	\$5,750
D-17	2,600	1	\$1,200	\$600	\$28,000
D-18	420	4	\$0	\$275	\$4,750
D-19	1,470	4	\$0	\$275	\$15,750
D-20	780	1	\$0	\$750	\$8,250
D-21	630	1	\$0	\$400	\$7,200
D-22	2,775	1	\$0	\$500	\$29,750
D-23	3,726	1	\$2,400	\$750	\$40,265
D-24	1,550	1	\$0	\$475	\$16,500
D-25	3,072	1	\$2,400	\$750	\$32,750
D-26	3,370	2	\$0	\$750	\$35,750
D-27	792	2	\$2,400	\$350	\$8,500
D-28	8,710	2	\$0	\$1,200	\$95,750
D-29	11,845	2	\$0	\$1,200	\$130,250
D-30	16,110	2	\$0	\$1,200	\$177,250
D-31	750	4	\$0	\$400	\$8,250
DO-1	455	3	\$0	\$250	\$5,000
DO-2	365	3	\$0	\$250	\$4,000





Roof Section	Area	Condition	Maintenance Repairs	Annual Maintenance Budget	Replacement Budget
DO-3	2,200	3	\$0	\$250	\$24,200
E-1	1,000	4	\$6,200	\$200	\$10,000
E-2	9,080	3	\$6,200	\$1,500	\$99,880
E-3	20,800	3	\$9,250	\$1,500	\$228,800
E-4	1,480	3	\$900	\$600	\$16,280
E-5	375	3	\$2,400	\$250	\$3,750
E-6	80	3	\$0	\$250	\$800
E-7	640	3	\$450	\$400	\$7,250
E-8	700	3	\$1,200	\$350	\$7,750
E-9	1,240	4	\$0	\$750	\$13,750
E-10	1,290	3	\$0	\$750	\$13,250
E-11	3,350	3	\$1,000	\$1,000	\$35,750
E-12	1,220	3	\$0	\$800	\$12,200
E-13	1,175	3	\$0	\$400	\$11,750
E-14	3,300	3	\$1,750	\$1,000	\$36,000
E-15	6,290	2	\$3,400	\$1,000	\$67,250
E-16	10,820	3	\$1,750	\$1,000	\$119,000
Fire-1	9,100	3	\$0	\$1,500	\$200,200
Fire-2	1,750	3	\$0	\$500	\$38,500
Fire-3	4,020	3	\$0	\$1,200	\$884,400
I-1	19,360	2	\$24,000	\$3,500	\$212,960
I-2	1,400	4	\$0	\$400	\$15,750
M-1	8,100	3	\$0	\$1,500	\$89,100
M-2	2,760	3	\$0	\$1,500	\$30,250
M-3	3,000	3	\$0	\$1,500	\$33,000
M-4	77,080	2	\$34,000	\$3,750	\$847,880
Maint-1	10,900	2	\$2,400	\$2,400	\$239,800
Maint-2	13,125	3	\$1,200	\$1,000	\$144,375
Maint-3	26,600	1	\$1,200	\$1,750	\$585,000
Maint-4	8,200	2	\$1,400	\$1,000	\$164,000
Maint-5	26,100	2	\$2,700	\$1,750	\$26,750
Maint-6	1,215	2	\$1,400	\$750	\$24,300
Maint-7	16,540	2	\$1,900	\$1,000	\$330,800
P-0	15,350	4	\$0	\$800	\$168,350
P-1	5,000	4	\$0	\$750	\$55,000



Roof Section	Area	Condition	Maintenance Repairs	Annual Maintenance Budget	Replacement Budget
P-2	5,650	4	\$5,800	\$750	\$62,150
P-3	1,080	5	\$0	\$250	\$11,880
P-4	1,085	5	\$0	\$250	\$11,880
P-5	18,450	4	\$0	\$500	\$184,500
P-6	660	3	\$750	\$750	\$6,600
P-7	660	3	\$0	\$750	\$6,600
P-8	230	3	\$750	\$750	\$4,750
P-9	230	3	\$750	\$750	\$4,750
P-10	252	4	\$750	\$500	\$5,750
P-11	252	4	\$1,200	\$500	\$5,750
P-12	264	4	\$0	\$500	\$5,900
P-13	264	4	\$0	\$500	\$5,900
P-14	500	4	\$0	\$350	\$7,400
P-15	500	3	\$0	\$350	\$7,400
P-16	250	4	\$500	\$150	\$6,700
P-17	250	4	\$0	\$150	\$6,700
P-18	250	4	\$0	\$150	\$6,700
P-19	44,580	4	\$0	\$750	\$445,800
P-20	200	3	\$0	\$100	\$5,200
Power-1	18,050	4	\$750	\$750	\$198,550
Power-2	800	4	\$0	\$750	\$9,000
R-1	2,460	4	\$0	\$750	\$27,000
R-2	1,375	4	\$0	\$500	\$15,250
Salt Shed	9,000	5	\$0	\$250	\$135,000



## **ROOF MAINTENANCE**

Per each roof, we assigned a maintenance budget. With the maintenance budget we attempted to anticipate cost from 2018 to 2022. This cost includes leak investigation and repairs, minor reactive maintenance and preventative maintenance repairs. In addition to the leak and minor maintenance repair budget, we have also compiled a list of more serious maintenance issues that are not covered within the annual leak and minor maintenance repair budget. The more serious maintenance repair items are listed in the following table. Following the table, we have included selected pictures showing some of the maintenance issues. If more pictures are required, feel free to contact us at any time.



Roof Section	Maintenance Description	Estimated Budget
C-1	Re-flash 200' of tented EPDM flashing.	\$3,200
C-3	Repair open fishmouths as needed.	\$1,200
C-10	Repair open fishmouths as needed.	\$1,200
C-18	Repair open fishmouths as needed.	\$1,200
C-19	Repair open fishmouths as needed.	\$1,200
D-A	Repair failing and lifted patches as needed.	\$7,750
D-9	Repair multiple failing patches.	\$1,750
D-11	Re-flash approx. 190' of wall flashing.	\$3,200
D-12	Re-flash roof drain.	\$1,200
D-17	Replace roof drain flashing.	\$1,200
D-23	Replace roof drain flashing.	\$2,400
D-25	Replace roof drain flashing.	\$2,400
D-27	Repair 90' of tented wall flashing.	\$2,400
E-2	Repair multiple nail pops and re-flash entire perimeter.	\$6,200
E-3	Re-adhere roof membrane.	\$9,250
E-4	Repair flashings as needed.	\$900
E-5	Repair flashings as needed.	\$2,400
E-7	Seal all holes in brick wall.	\$450
E-8	Re-seal (3) three pitch pans.	\$1,200
E-11	Re-flash multiple expansion joint lap seams.	\$1,000
E-14	Replace 8' of missing wall flashing. Re-flash (5) five expansion joint end seams.	\$1,750
E-15	Repair (2) two 40' splits in field. Re-flash expansion joint as needed.	\$3,400
E-16	Re-flash 30' of perimeter flashing. Re-flash (3) three through wall scuppers.	\$1,750
I-1	Re-flash the entire perimeter.	\$24,000
M-4	Multiple repairs are required throughout the roofing assembly.	\$34,000
Maint-1	Caulk holes in concrete wall. Inspect field and flashings, repair as needed.	\$2,400
Maint-2	Repair open heat stack flange flashing. Add foam and caulk wall expansion joint.	\$1,200
Maint-3	Multiple pitch pans require repair. Remove and replace (2) two 4"x16" pitch pans.	\$1,200
Maint-4	Repair Northeast & Northwest corners.	\$1,400
Maint-5	Remove and replace (9) nine pitch pans.	\$2,700



Maint-6	Repair metal wall flashing & caulk. Remove and replace (2) two - 4" pitch pans.	\$1,400
Maint-7	Repair multiple holes in flashings. Replace missing McKinley vent top. Repair multiple pitch pans.	\$1,900
P-2	Re-flash 60' of perimeter flashing. Repair expansion joint as needed.	\$5,800
P-6	Seal all transition metal panel joints. Seal all expansion joints.	\$750
P-8	Repair perimeter flashings as needed. Coat the entire perimeter flashing.	\$750
P-9	Repair perimeter flashings as needed. Coat the entire perimeter flashing.	\$750
P-10	Seal hole in metal wall panel.	\$750
P-11	Repair 30' of tenting perimeter flashing.	\$1,200
P-16	Properly secure penthouse metal roof flashing. Seal with a solid bead of caulk.	\$500
Power-1	Multiple pitch pans require to be re-sealed.	\$750
	<b>TOTAL</b>	<b>\$140,050</b>





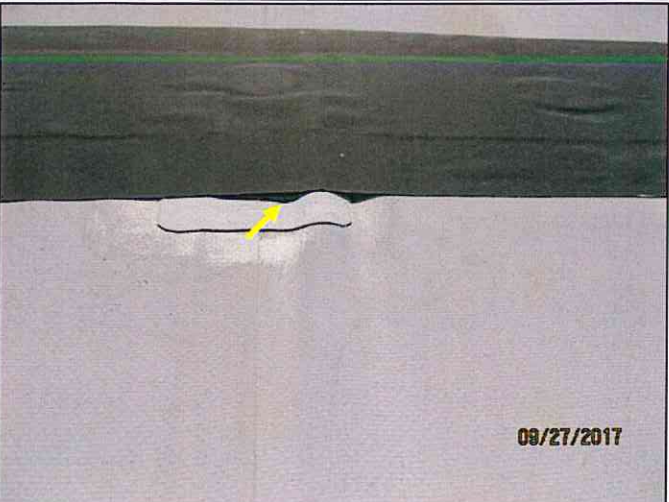
C-18

- Repair open fishmouths as needed.
- Excessive wrinkling.



C-19

- Repair open fishmouths as needed.
- Excessive wrinkling.



D-A

- Repair failing and lifted patches as needed.



D-9

- Repair multiple failing patches.
- Roof is ready for replacement.



D-11

- Re-flash approximately 190' of wall flashing



D-12

- Re-flash roof drain.





D-17

- Replace drain flashing.



D-23

- Replace drain flashing.



D-27

- Repair 90' of tented wall flashings.

## DRAWING INDEX

Sheet Number	Drawing Title
S-100	Satellite
R-100	Airport Overview
R-101	D-Concourse Overview
R-102	Administration Building & C-Concourse Overview
R-103	Baggage & Main Overview
R-104	E-Concourse & Drop Off Overview
R-105	Powerhouse & International Terminal Overview
R-106	Maintenance & Salt Shed Overview
R-107	Fire House & Regulator Building Overview
R-108	Parking Overview



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General Mitchell International Airport  
5300 South Howell Ave  
Milwaukee, WI

### Drawing Index

Job Number	24-24845	<b>R-000</b>
Date	11/7/2017	
Drawn by	RSS	
Sheet Number	1 of 1	
Scale:		NTS





# Airport Overview Satellite

Job Number	24-24845
Date	11/10/2017
Drawn by	RSS
Sheet Number	1 of 1
Scale:	NTS

General Mitchell International Airport  
5300 South Howell Ave  
Milwaukee, WI

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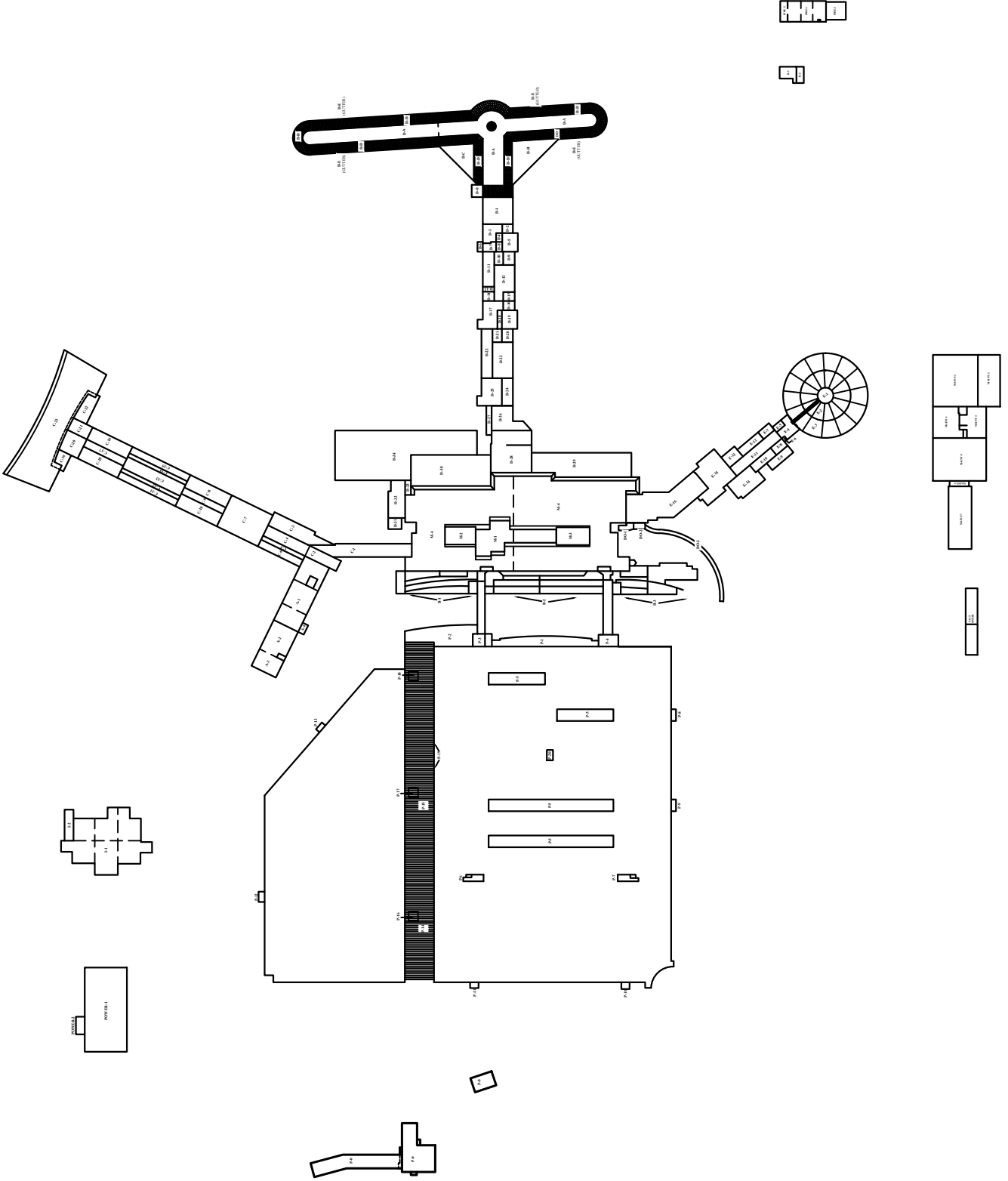


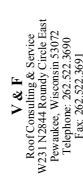
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## Airport Overview

R-100

Project Number	24-24845
Date	12-29-17
Drawn By	RSS
Sheet Number	1 of 1
Scale	NTS

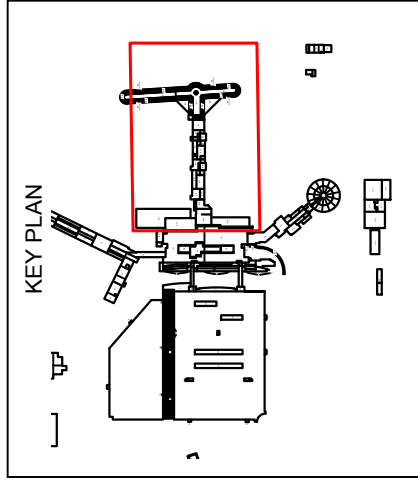
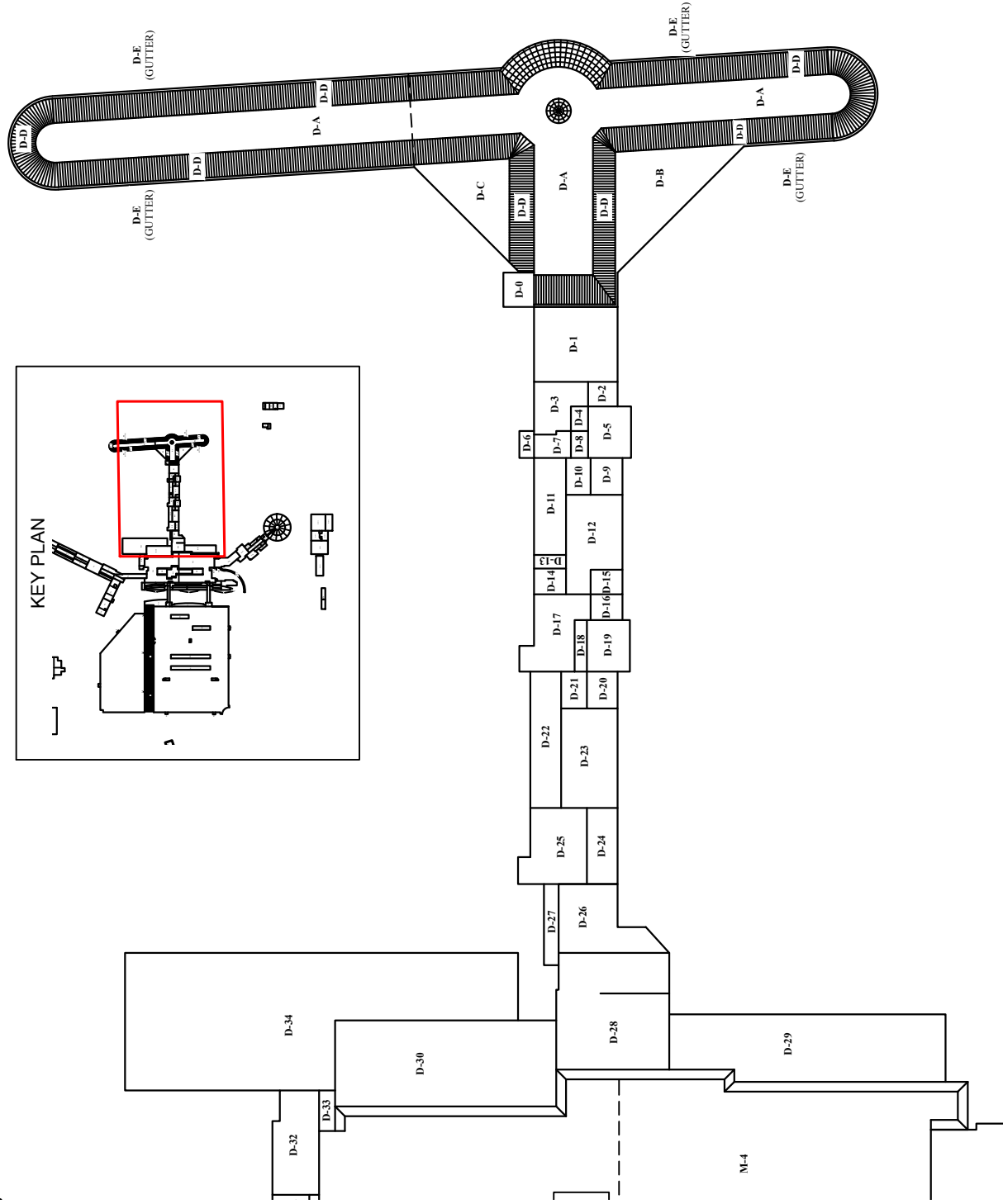


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## D-Concourse Overview

R-101

Project Number	24-24844
Date	12/26/2011
Drawn By	RSN
Sheet Number	1 of 1
Scale	NTS





## **INDIVIDUAL ROOF SUMMARIES**

The following pages are individual roof summaries that lists the Estimated Age, Roof Area, Structural Deck, Drainage, Vapor Retarder, Insulation Type, R-factor, Membrane Type, Flashing Material, Surfacing, Estimated remaining roof service life, Replacement Budget, Annual Maintenance Budget.

## **ROOF CONDITION SUMMARY**



## D-Concourse





### D-Concourse

Roof Section	D-A
Estimated Age	24-29
Roof Area (SF)	27,850
Structural Deck	Metal
Drainage	Roof Drains
Vapor Retarder	-
Insulation	2" Phenolic Foam, 1" Perlite
R-Factor	15.28
Membrane	TPO-Mechanically Attached
Flashing	TPO
Surfacing	-
Estimated Roof Service Life	1-3 years
Replacement Cost	\$306,350
Annual Maintenance Budget	\$1,500







### D-Concourse

Roof Section	D-B
Estimated Age	24-29
Roof Area (SF)	5,244
Structural Deck	Metal
Drainage	Roof Drain
Vapor Retarder	-
Insulation	2 ½" Phenolic Foam, 1" Perlite
R-Factor	18.4
Membrane	TPO-Mechanically Attached
Flashing	TPO
Surfacing	-
Estimated Roof Service Life	1-3
Replacement Cost	\$57,640
Annual Maintenance Budget	\$750





### D-Concourse

Roof Section	D-C
Estimated Age	24-29
Roof Area (SF)	3,350
Structural Deck	Metal
Drainage	Roof Drain
Vapor Retarder	-
Insulation	2.5" Phenolic Foam, 1" Perlite
R-Factor	18.4
Membrane	TPO-Mechanically Attached
Flashing	TPO
Surfacing	-
Estimated Roof Service Life	1-3
Replacement Cost	\$36,850
Annual Maintenance Budget	\$750





### D-Concourse

Roof Section	D-D
Estimated Age	24-29
Roof Area (SF)	31,200
Structural Deck	DNC
Drainage	Perimeter Gutter
Vapor Retarder	DNC
Insulation	DNC
R-Factor	DNC
Membrane	Metal Panels
Flashing	Metal
Surfacing	-
Estimated Roof Service Life	10+
Replacement Cost	\$358,800
Annual Maintenance Budget	\$750





### D-Concourse

Roof Section	D-E
Estimated Age	24-29
Roof Area (SF)	2,280
Structural Deck	Metal
Drainage	Roof Drains
Vapor Retarder	-
Insulation	Tapered Perlite, 2" Phenolic Foam, Dens Deck
R-Factor	Varies
Membrane	TPO-Mechanically Attached
Flashing	TPO
Surfacing	-
Estimated Roof Service Life	1-3
Replacement Cost	\$60,000
Annual Maintenance Budget	\$1,000





### D-Concourse

Roof Section	D-0
Estimated Age	24-29
Roof Area (SF)	700
Structural Deck	Metal
Drainage	Roof Drain
Vapor Retarder	-
Insulation	2" Phenolic Foam, 1" Perlite
R-Factor	15.28
Membrane	TPO-Mechanically Attached
Flashing	TPO
Surfacing	-
Estimated Roof Service Life	1-3
Replacement Cost	\$8,000
Annual Maintenance Budget	\$500







### D-Concourse

Roof Section	D-1
Estimated Age	24-29
Roof Area (SF)	4,150
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	-
Insulation	Asphaltic Fill, 2" Perlite
R-Factor	
Membrane	Built-Up
Flashing	Smooth Surfaced Modified
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$45,650
Annual Maintenance Budget	\$1,000





### D-Concourse

Roof Section	D-2
Estimated Age	12-14
Roof Area (SF)	480
Structural Deck	Concrete
Drainage	Roof Drain
Vapor Retarder	-
Insulation	3.5" Polyiso
R-Factor	19.25
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	10+
Replacement Cost	\$5,280
Annual Maintenance Budget	\$200





### D-Concourse

Roof Section	D-3
Estimated Age	24-29
Roof Area (SF)	1,535
Structural Deck	Concrete
Drainage	Roof Drain
Vapor Retarder	Yes
Insulation	2" Asphaltic Fill, 2" Perlite
R-Factor	
Membrane	Built-Up
Flashing	Smooth Surfaced Modified
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$17,500
Annual Maintenance Budget	\$1,000







### D-Concourse

Roof Section	D-4
Estimated Age	11-14
Roof Area (SF)	280
Structural Deck	Concrete
Drainage	Roof Drain
Vapor Retarder	Yes-4 Ply Hot
Insulation	2 ½" Polyiso, 2 ½" Polyiso
R-Factor	27.5
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	10+
Replacement Cost	\$3,200
Annual Maintenance Budget	\$250





### D-Concourse

Roof Section	D-5
Estimated Age	11-14
Roof Area (SF)	1,470
Structural Deck	Metal
Drainage	Water Over Edge
Vapor Retarder	-
Insulation	1" Polyiso, 1" Hardboard
R-Factor	6.86
Membrane	EPDM-Fully Adhered
Flashing	-
Surfacing	-
Estimated Roof Service Life	10+
Replacement Cost	\$16,750
Annual Maintenance Budget	\$300





### D-Concourse

Roof Section	D-6
Estimated Age	24-29
Roof Area (SF)	265
Structural Deck	Concrete
Drainage	Roof Drain
Vapor Retarder	-
Insulation	4" Asphaltic Fill, 2 ½" Perlite
R-Factor	-
Membrane	Built-Up
Flashing	Smooth Surfaced Modified
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$3,500
Annual Maintenance Budget	\$400





### D-Concourse

Roof Section	D-7
Estimated Age	24-29
Roof Area (SF)	606
Structural Deck	Metal
Drainage	Roof Drain
Vapor Retarder	-
Insulation	Asphaltic Fill, 2 Layers Perlite
R-Factor	18
Membrane	Built-Up
Flashing	Organic
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$7,750
Annual Maintenance Budget	\$400







### D-Concourse

Roof Section	D-8
Estimated Age	11-14
Roof Area (SF)	308
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	Yes
Insulation	3" Polyiso, ½" Hardboard
R-Factor	17.1
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	10+
Replacement Cost	\$3,080
Annual Maintenance Budget	\$200





### D-Concourse

Roof Section	D-9
Estimated Age	24-29
Roof Area (SF)	780
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	-
Insulation	1" Phenolic Foam, Tapered Perlite
R-Factor	Varies
Membrane	TPO-Mechanically Attached
Flashing	TPO
Surfacing	-
Estimated Roof Service Life	1-3
Replacement Cost	\$9,800
Annual Maintenance Budget	\$750





### D-Concourse

Roof Section	D-10
Estimated Age	24-29
Roof Area (SF)	600
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	-
Insulation	3" Asphaltic Fill, 3" Perlite
R-Factor	
Membrane	Built-Up
Flashing	Smooth Surfaced Modified
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$6,000
Annual Maintenance Budget	\$450







### D-Concourse

Roof Section	D-11
Estimated Age	24-29
Roof Area (SF)	2,054
Structural Deck	Concrete
Drainage	Roof Drains & Scuppers
Vapor Retarder	-
Insulation	Tapered Polyiso
R-Factor	Varies
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	1-3
Replacement Cost	\$22,750
Annual Maintenance Budget	\$800







### D-Concourse

Roof Section	D-12
Estimated Age	24-29
Roof Area (SF)	3,200
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	Yes
Insulation	Asphaltic Fill, Tapered Perlite
R-Factor	Varies
Membrane	Built-Up
Flashing	Smooth Surfaced Modified
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$35,000
Annual Maintenance Budget	\$750





### D-Concourse

Roof Section	D-13
Estimated Age	24-29
Roof Area (SF)	286
Structural Deck	Concrete
Drainage	Roof Drains & Scupper
Vapor Retarder	-
Insulation	2" Polyiso
R-Factor	11
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	1-3
Replacement Cost	\$3,750
Annual Maintenance Budget	\$400





### D-Concourse

Roof Section	D-14
Estimated Age	24-29
Roof Area (SF)	546
Structural Deck	Metal
Drainage	Roof Drains
Vapor Retarder	-
Insulation	1" Perlite, Tapered Poly
R-Factor	Varies
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	1-3
Replacement Cost	\$5,750
Annual Maintenance Budget	\$400







### D-Concourse

Roof Section	D-15
Estimated Age	24-29
Roof Area (SF)	520
Structural Deck	Metal
Drainage	Roof Drains & Scuppers
Vapor Retarder	-
Insulation	1" Perlite, Tapered Poly
R-Factor	Varies
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	1-3
Replacement Cost	\$5,750
Annual Maintenance Budget	\$400





### D-Concourse

Roof Section	D-16
Estimated Age	11-14
Roof Area (SF)	545
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	-
Insulation	2" Poly, 2" Poly
R-Factor	16
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	10+
Replacement Cost	\$5,750
Annual Maintenance Budget	\$200





### D-Concourse

Roof Section	D-17
Estimated Age	24-29
Roof Area (SF)	2,600
Structural Deck	Concrete
Drainage	Roof Drains & Scuppers
Vapor Retarder	Yes
Insulation	Asphaltic Fill, Perlite
R-Factor	Varies
Membrane	Built-Up
Flashing	Smooth Surfaced Modified
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$28,000
Annual Maintenance Budget	\$600







### D-Concourse

Roof Section	D-18
Estimated Age	11-14
Roof Area (SF)	420
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	Yes
Insulation	3" Polyiso, ½" Hardboard
R-Factor	17.1
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	10+
Replacement Cost	\$4,750
Annual Maintenance Budget	\$275





### D-Concourse

Roof Section	D-19
Estimated Age	11-14
Roof Area (SF)	1,470
Structural Deck	Metal
Drainage	Water Over Edge
Vapor Retarder	-
Insulation	1" Polyiso, 1" Hardboard
R-Factor	6.86
Membrane	EPDM-Fully Adhered
Flashing	-
Surfacing	-
Estimated Roof Service Life	10+
Replacement Cost	\$15,750
Annual Maintenance Budget	\$275







### D-Concourse

Roof Section	D-20
Estimated Age	24-29
Roof Area (SF)	780
Structural Deck	Concrete
Drainage	Roof Drain
Vapor Retarder	-
Insulation	1" Phenolic Foam, Tapered Perlite
R-Factor	Varies
Membrane	TPO-Mechanically Attached
Flashing	TPO
Surfacing	-
Estimated Roof Service Life	1-3
Replacement Cost	\$8,250
Annual Maintenance Budget	\$400





### D-Concourse

Roof Section	D-21
Estimated Age	24-29
Roof Area (SF)	630
Structural Deck	Concrete
Drainage	Roof Drains & Scuppers
Vapor Retarder	Yes
Insulation	Asphaltic Fill, Perlite
R-Factor	Varies
Membrane	Built-Up
Flashing	Smooth Surfaced Modified
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$7,200
Annual Maintenance Budget	\$400





### D-Concourse

Roof Section	D-22
Estimated Age	24-29
Roof Area (SF)	2,775
Structural Deck	Concrete
Drainage	Roof Drains & Scuppers
Vapor Retarder	-
Insulation	Asphaltic Fill, Perlite
R-Factor	Varies
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	1-3
Replacement Cost	\$29,750
Annual Maintenance Budget	\$500







### D-Concourse

Roof Section	D-23
Estimated Age	24-29
Roof Area (SF)	3,726
Structural Deck	Concrete
Drainage	Roof Drains & Scuppers
Vapor Retarder	Yes
Insulation	Asphaltic Fill, Perlite
R-Factor	Varies
Membrane	Built-Up
Flashing	Smooth Surfaced Modified
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$40,265
Annual Maintenance Budget	\$750





### D-Concourse

Roof Section	D-24
Estimated Age	24-29
Roof Area (SF)	1,550
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	-
Insulation	Tapered Poly
R-Factor	Varies
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	1-3
Replacement Cost	\$16,500
Annual Maintenance Budget	\$475





### D-Concourse

Roof Section	D-25
Estimated Age	24-29
Roof Area (SF)	3,072
Structural Deck	Concrete
Drainage	Roof Drains & Scuppers
Vapor Retarder	Yes
Insulation	Asphaltic Fill, Perlite
R-Factor	Varies
Membrane	Built-Up
Flashing	Smooth Surfaced Modified
Surfacing	Gravel
Estimated Roof Service Life	1-3
Replacement Cost	\$32,750
Annual Maintenance Budget	\$750







### D-Concourse

Roof Section	D-26
Estimated Age	24-29
Roof Area (SF)	3,370
Structural Deck	Metal
Drainage	Roof Drains & Scuppers
Vapor Retarder	-
Insulation	2" Poly
R-Factor	8
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	1-3
Replacement Cost	\$35,750
Annual Maintenance Budget	\$750





### D-Concourse

Roof Section	D-27
Estimated Age	24-29
Roof Area (SF)	792
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	-
Insulation	1" Phenolic Foam, Tapered Perlite
R-Factor	Varies
Membrane	TPO-Mechanically Attached
Flashing	TPO
Surfacing	-
Estimated Roof Service Life	1-3
Replacement Cost	\$8,500
Annual Maintenance Budget	\$350





### D-Concourse

Roof Section	D-28
Estimated Age	24-29
Roof Area (SF)	8,710
Structural Deck	Metal
Drainage	Roof Drains & Scuppers
Vapor Retarder	-
Insulation	2" Poly, Tapered Poly
R-Factor	Varies
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	EPDM
Estimated Roof Service Life	1-3
Replacement Cost	\$95,750
Annual Maintenance Budget	\$1,200







### D-Concourse

Roof Section	D-29
Estimated Age	24-29
Roof Area (SF)	11,845
Structural Deck	Concrete
Drainage	Roof Drains
Vapor Retarder	-
Insulation	Tapered Poly
R-Factor	Varies
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	1-3
Replacement Cost	\$130,250
Annual Maintenance Budget	\$1,200





### D-Concourse

Roof Section	D-30
Estimated Age	24-29
Roof Area (SF)	16,110
Structural Deck	Concrete
Drainage	Roof Drains & Scuppers
Vapor Retarder	-
Insulation	Tapered Poly
R-Factor	Varies
Membrane	EPDM-Ballasted
Flashing	EPDM
Surfacing	Ballast
Estimated Roof Service Life	1-3
Replacement Cost	\$177,250
Annual Maintenance Budget	\$1,200







### D-Concourse

Roof Section	D-31
Estimated Age	14-19
Roof Area (SF)	750
Structural Deck	Metal
Drainage	Roof Drains
Vapor Retarder	-
Insulation	Tapered Polyiso, ¾" Perlite
R-Factor	Varies
Membrane	Built-Up
Flashing	Modified Bitumen
Surfacing	Gravel
Estimated Roof Service Life	10+
Replacement Cost	\$8,250
Annual Maintenance Budget	\$400

